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POLICE VILLAGE OF MOUNT ALBERT 1968
TOWNSHIP OF GWILLIMBURY

THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

POLICE VILLAGE OF MOUNT ALBERT

TOWNSHIP OF EAST GWILLIMBURY

1968

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Report on a water pollution survey of the police village of Mount Albert, township of East Gwillimbury, county of York.

80373

Report

on a

Water Pollution Survey

of the

POLICE VILLAGE OF MOUNT ALBERT

Township of East Gwillimbury

County of York

May 1968

District Engineers Branch

Division of Sanitary Engineering

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R E P O R T

THE ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

The Ontario Water Resources Commission is concerned with the management of the Province's water resources as they are related to the needs of water supply, waste disposal and other areas of use. In keeping with this responsibility the Commission examines water quality in areas of active and potential use.

This survey was made to determine the extent of surface-water pollution within the Police Village of Mount Albert by collecting samples from the surface waters and discharges to these waters. Also a cross-section of the private, well-water supplies was sampled for bacteriological examination, to determine approximately the extent of ground-water contamination within the community.

The appendices include the results of the samples collected, an interpretation of these results and a map of the police village showing the sampling point locations.

GENERAL

Mount Albert is located on Highway 48 about 25 miles north of Toronto. The population is slightly in excess of 600.

WATER SUPPLY

Private wells are used to obtain drinking water. These are shallow dug wells ranging from 10 to 35 feet deep. Also, there are several drilled wells in excess of 100 feet deep, some of which

are flowing under artesian conditions.

There are numerous springs in the area and generally, the supply of water appears to be plentiful. In most instances each premises has its own well and the supply is adequate for its needs.

SURFACE WATER DRAINAGE

The ditches in the village carry surface-water drainage to three swamp areas, one of which is located within the community, and to Vivian Creek. Vivian Creek rises just south of Mount Albert and flows through the northeastern part of the community to its confluence with the Black River, some 5 miles north of the village.

A storm sewer serving Centre Street drains to Vivian Creek where it crosses this street. For the purpose of this report this outfall is designated as sampling point BRMV 17.3-W. A major drainage course in the village is a small spring fed stream which originates behind Lot 68 and flows in a westerly direction along the south side of Mill Street to a large swamp at the west end of the community. Generally, the remaining ditches drain to other swamp areas located within the village and to the north and south of it.

SEWAGE DISPOSAL

Septic tanks and subsurface disposal systems consisting of regular tile beds or cesspools are used to dispose of domestic sewage. The lots on Centre Street are small in relation to the size of the buildings leaving little room for properly designed systems. Various

improvised methods are used, including systems of cesspools in conjunction with septic tanks, regular pumping of tanks, or in some cases a connection to the storm sewer. Many of the residential lots containing a well and a sewage disposal system are considerably less in area than the generally accepted minimum of 15,000 square feet.

INDUSTRY

There is no major industry in Mount Albert. The following are the principal commercial establishments of the community.

Choice Cut-up Chicken Limited, (Hatchery Division),
Mount Albert Creamery,
Kyte Lumber Company,
Waggs Lumber,
Sedore Loaders,
Mount Albert Grain and Fuel,
Lawries Farm Supplies,
Case and Dyke Feed Mill,
Jim's Plywood Shop.

The only sources of liquid industrial wastes are the Choice Cut-up Chicken Limited plant and the Mount Albert Creamery. The Choice Cut-up Chicken plant hatches chicks on a twice-weekly basis. The water supply is a drilled flowing well 95 feet in depth. Apparently the well flows at about 2,200 gallons per hour; approximately 10,000 gallons per day are put through the premises in the clean-up operation. On hatching days, the waste contains considerable quantities of fluff and eggshells. This waste is directed to a large swamp area north of the building. This area extends northward for almost one-half mile to Vivian Creek. The operation did not appear

to be creating a pollution problem in the creek; however, it should be kept under surveillance as a potential pollution source.

The Mount Albert Creamery produces 12-14,000 pounds of butter per week. Water is obtained from an artesian well and 10-15,000 gallons are used per day for cooling water and general cleaning; the wastes drain to a marshy area south of the plant. This marsh extends across Highway 48 for about one-half mile toward Mount Albert Creek. Because of the remoteness of the watercourse, the operation does not appear to be causing a pollution problem to the creek. The Division of Industrial Wastes of the Commission will continue to keep the area under observation.

REFUSE DISPOSAL

Refuse is disposed of in the East Gwillimbury municipal refuse disposal site.

RESULTS OF SURVEY

Surface Waters

Although there are some sources of contamination, the pollution of surface waters in the community does not appear to be severe. The results of the samples collected from the storm outfall (BRMV 17.3-W) and the small private outfall (BRMV 17.3-P) indicate moderate contamination of these discharges. Satisfactory BOD values were noted in the samples from Vivian Creek. Four bacteriological samples collected downstream from the built-up area revealed two

satisfactory results and two counts slightly in excess of the OWRC objective for surface waters.

Although there is evidence of some domestic waste drainage to the Mount Albert ditch, generally satisfactory results were obtained in the samples collected from this small watercourse. Two BOD values slightly in excess of the OWRC objective were noted. Since much of the flow in these ditches is spring water, the resulting dilution of any sewage effluent gaining access to these flows must be considered in assessing the laboratory results.

Wells

Samples were collected from 43 dug and drilled private wells. The bacteriological results are shown in table III and indicate coliform contamination in five of these wells. This represents 12 percent of the wells sampled and it is therefore concluded that well contamination in the community is not occurring to a serious degree at the present time.

The chemical analyses revealed the water of the seven wells tested to be very hard, a common characteristic of ground-water supplies. Two samples displayed high iron contents. Water should have a soluble iron content of less than 0.3 parts per million to prevent staining of plumbing fixtures and deposition of iron in pipes. A concentration of about 1 part per million may cause metallic tastes.

DISCUSSION

Since the pollution of ground and surface waters does not

appear to be critical, the provision of municipal water and sewage works at the present time may not be practical. With the exception of Centre Street, problems with private septic tank systems are quite sporadic and can be corrected on a private basis. It does not appear possible to correct the malfunctioning systems on Centre Street on an individual basis. However, the possibility of communal septic tank system, each serving a number of premises in this area should be investigated. If this alternative cannot be achieved, then a municipal sewage works system will be the only solution to the problem.

SUMMARY

A water pollution survey of the Police Village of Mount Albert revealed that although there are some sources of contamination, the pollution of surface waters in the community does not appear to be severe. The main problem area is the commercial section of Centre Street where a number of sewage disposal systems drain to the storm sewer. Although the provision of sewage works to serve this small area at the present time may be impractical, it may be the only solution to the sewage disposal problem.

The samples collected from private wells indicate that well contamination is not occurring to a serious degree at the present time.

RECOMMENDATIONS

1. Where possible, malfunctioning sewage disposal systems should be corrected on a private basis.

2. The possibility of providing communal septic tank systems to serve Centre Street should be investigated.

3. The provision of a municipal sewage works system should be considered as a final alternative.

4. The source of contaminants to the contaminated wells should be determined and eliminated. These wells should be disinfected.

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Prepared by:

M.M. Holy, Technician,
Div.of Sanitary Engineering.

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogeneous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greather than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

   As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALLY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

RESULTS OF SAMPLES PERTAINING TO

VIVIAN CREEK

TABLE I

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	Coliforms per 100 ml	Comments
BRMV 16.5	Vivian Cr.at Hwy.48 downstream from Mount Albert.	Apr. 21/67	1.2	274	2	272	5,100	
		July 14/67	2.0	310	8	302	1,200	
		Sept.28/67					5,700	
BRMV 17.2	Vivian Cr.just downstream from built-up area.	Apr. 5/68					4,100	
		Apr. 8/68	1.6	318	23	295	1,200	
BRMV 17.3	Vivian Creek at main bridge- Mount Albert.	July 14/67	2.8	284	6	278	1,200	
		Sept.28/67					5,700	
		Apr. 5/68	1.2	384	36	348	12	
BRMV 17.3-W	18-inch concrete storm sewer out-fall to Vivian Cr. at main bridge.	July 14/67	7.2	470	143	327	71,000	Flow cloudy
		Sept.28/67	4.8	578	334	244	830,000	5 gpm very turbid
		Apr. 5/68						No flow
		Apr. 8/68						No flow
BRMV 17.3-P	8-inch wooden out-fall to Vivian Cr. at main bridge.	Apr. 5/68	2.4	1318	11	1307	170,000	
		Apr. 8/68						Minimal flow
BRMV 18.5	Vivian Cr.at side-road upstream from Mount Albert.	Apr. 21/67	1.4	212	3	209	70	
		Apr. 5/68	0.8	334	44	290	4	

RESULTS OF SAMPLES PERTAINING TO

MOUNT ALBERT DITCH

TABLE II

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids			Coliforms per 100 ml
				Total (ppm)	Susp. (ppm)	Diss. (ppm)	
MAD 1	Mount Albert Ditch just upstream from where it discharges to swamp area.	Apr. 5/68	4.8	874	29	845	840
		Apr. 8/68	3.6	812	14	798	900
MAD 2	Mount Albert Ditch at King Street.	Apr. 8/68	0.8	714	8	706	92
MAD 3	Mount Albert Ditch just downstream from Case and Dike Feed Mill.	Apr. 8/68	6.0	978	61	917	1,460

RESULTS OF BACTERIOLOGICAL SAMPLES

COLLECTED FROM PRIVATE WELLS

TABLE III

Street	Lot No.	Name	Laboratory Results: MPN-Total Coliforms per 100 ml	Laboratory Results: Membrane Filter Coliforms per 100 ml
Centre	148	Norm Wilson	0	
	146	Post Office (P. Westgarth)	0	
	145	Farrs Pharmacy	39+	
	89	Dr. Slingerland	0	
	55	Hardware (T. Rogers)	0	
	141	Mortsons Restaurant	0	
	137	Coopers Nursing Home	0	
	58	E. Davis	36	
	58	P. Weerdenburg	0	
	60	Don Boyd	0	
	131	Lorne Hillis	0	
	63	W. Farr	0	
	116	R. Stentiford	0	
Alice	165	R. Cupples	0	
	174	H. Harman	0	
	160	C. Rogers	0	
	155	Miss M. Dike	0	
	180	Rev. W.J. Marsh	0	
	184	N. Brooks		0
	146	W. Rate		0
Water	112	Mrs.M. Brown		2,100
North	108	M. Case		0
		N. Case		0

TABLE III (CONTD)

Street	Lot No.	Name	Laboratory Results Membrane Filter Coliforms per 100 ml
Mill	100	C. Mitchell	0
	100	B. Rolling	0
	92	J.W. Thompson	0
	84	G. Riseborough	0
	78	J. Helm	0
	124	G. Green	0
		Mrs.H. Hayes	8
King	15	R. Boags	0
	7	E. Sedore	0
	22	A. Thorpe	0
Main	76	B. Lapp	0
	121	J. Reynard	0
	50	Mrs.I. Morton	0
	68	R. Harrison	4
	41	H.W. Pearson	0
Victory Drive	27	O. Dike	0
		G. Tienkamp	0
	37	J. Curl	0
Hwy. 48	4	J. Green	0
Albert		G. Walsh	0

RESULTS OF SAMPLES COLLECTED

FOR CHEMICAL ANALYSES

TABLE IV

Name	Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Iron as Fe (ppm)	Chloride as Cl (ppm)	pH at Lab
Mrs. M. Brown	500	336	0.16	174	7.4
B. Lapp	568	390	0.08	105	7.4
Rev. W.J. Marsh	276	238	0.25	6	7.8
Lorne Hillis	380	259	3.20	37	7.8
Dr. Slingerland	266	250	0.25	47	7.9
J. Curl	608	274	0.11	444	7.4
G. Walsh	256	241	5.40	4	7.9

MOUNT ALBERT

EAST GWILLIMBURY TWP

BRMV 16.5

VIVIAN

BRMV 17.2

BRMV 17.3

BRMV 17.3 P

BRMV 17.3 W

CREEK

MARSH

CHOICE CUT-UP
CHICKEN LIMITED
WASTE DISCHARGE

X LOT 124 - G GREEN

PRINCESS

MAD - 1

MAD - 2

MAD - 3

ST.

LOT 112 - X

X LOT 108

NORTH

LOT 103 X

LOT 100

MILL

WATER

X LOT 92

X LOT 89

LOT 116 - X

X - LOT 148

X - LOT 146 - X

X - LOT 145

BANK

X - LOT 4

MAIN

X LOT 121

VICTORIA

X LOT 76

LOT 78 X

LOT 84 X

X LOT 68

X - LOT 141

X - LOT 164

HWY 48

C.N.R.

LOT 15 - X

LOT 27 - X

DR

LOT 41 X

LOT 50 X

LOT 55 - X

X - LOT 38 X

LOT 155 - X

X - LOT 137

X - LOT 180

MARSH

LOT 60 - X

WILLIAM

X - LOT 22

KING

X VICTORY

CENTRE

X - LOT 131

X - LOT 160

ALICE

X - LOT 174

X - LOT 37

LOT 63 - X

LOT 165 - X

LOT 7 - X

ALBERT

BRMV 18.5

MOUNT ALBERT CREAMERY
WASTE DISCHARGE

MARSH

LEGEND

BRMV 17.3 — SAMPLING POINT SHOWING STREAM AND MILEAGE

BRMV 17.3
P — OUTFALL SAMPLING POINT
TYPE OF OUTFALL
P — PRIVATE OUTFALL
W — STORM SEWER

X — WELL SAMPLE

ONTARIO WATER RESOURCES COMMISSION

POLICE VILLAGE OF MOUNT ALBERT
TWP. OF EAST GWILLIMBURY
WATER POLLUTION SURVEY
1968

SCALE: 0 100 200 400 600 FT.

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